Space Weather Forecast

Issued on Tuesday, 18 April 2023 at 01:15 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Moderate-class X-ray flares (R1-R2 Minor-Moderate radio blackouts), and a slight chance of Strong-Class flares (R3 strong radio blackouts) throughout. Increasing chance of Minor Geomagnetic Storms on 19-20 Apr with a slight chance of Moderate or Strong Geomagnetic Storms on the 20 Apr due to possible CME (coronal mass ejection) arrival.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low, with only two notable Common-class flares. The flares appeared to be from two regions in the southeast quadrant at 17/0633 and 17/1431UTC. There are nine active regions in total on the visible disc, with two of the larger regions, one approaching centre-disc and one rotating off the southwest limb. A string of three regions in the south collectively present a significant risk of flare activity. No Earth-directed CME have been observed on available imagery in the last 24 hours, although imagery is being awaited for ongoing analysis.

Solar Wind / Geomagnetic Activity: The solar wind was Slow before a steady rise towards slightly elevated values early on 17 Apr, possibly due to a weak connection to a fast solar wind region. Total magnetic field strength was at weak to moderate levels. The important north-south component varied weakly for much of the period, before a temporary sharp southward rotation towards moderate levels around 16/1300UTC. Geomagnetic activity was Quiet.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity starting Low, with a likelihood of Moderate activity through the next four days. There is a slight chance of isolated Strong flaring activity.

Solar Wind / Geomagnetic Activity: Two CMEs are forecast to affect the Earth in this period. One, as a low confidence glancing blow on 19 Apr, with a further more direct near full halo on 20 Apr. Otherwise solar winds are expected to remain mainly at background, with an initial enhancement to slightly elevated values as a result of a weak fast solar wind during 18 Apr. A further fast solar wind is possible late on 20 Apr, but this may be masked by the forecast CME arrival. Geomagnetic activity is forecast to be Quiet to Unsettled, with a chance of G1/Minor Storm intervals on 19 and 20 Apr. There is also a risk of G2/Moderate or G3/Strong storms on 20 Apr depending on the strength of the CME arrival.

Energetic Particles / Solar Radiation: Solar radiation storms are not expected and should remain at background levels, although there is a slight chance of a greater than S1 event as some of the more complex active regions transit towards the western solar hemisphere, where they are more likely to connect with the Earth.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	20	40	20
Strong	G3	No	1	1	10	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	60	60	60	60
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	10	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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